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January 19, 1946

To: Dr. R.S. Stone

From: Dr. J.J. Helmer

Subject: Monthly Summary for Section H-III

CLASSIFICATION CANCELLED
 DATE 1-27-56
 For the Atomic Energy Commission
H.F. Carroll
 Chief, Declassification Branch *HFC*

I. Routine Urine Survey for Plutonium Activity

A. Urine Specimens received

Chicago	69
Other	39

B. Backlog of specimens

Chicago	51
Other	23

C. Specimens analyzed

Chicago	69
Other	23

Of the Chicago specimens analyzed, 7.3 per cent showed a body content of plutonium greater than 0.1 ug, 32 per cent showed negative counts (maximum being less than 0.1 count per minute) and the remainder showed less than 0.1 ug retained in the body.

The laboratory which was designed to be dust-free in order to avoid outside contamination has not met the specifications. However, control urines have been run quite frequently and none have shown counts in excess of 0.1 count per minute per 1000 ml sample.

Special Entries: Two humans were injected with 94.91 ug of plutonium on December 27, 1945. The composition of the injected solution and the volume injected is given in Table I. The urinary plutonium excretion for the male subject is given in Table II and for the female in Table III.

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Table I
Composition of Solution

Plutonium concentration	21.57 $\mu\text{g/ml}$
Volume injected (each)	6.5 ml
ml	6.5
Sodium citrate	0.01 M
Isotonic Saline	

Table II
Daily Plutonium: Urinary Excretion (Table)
HK-203

Days after injection	24 hour volume	Specific activity	Percent of injected dose excreted
1	1130 ml	1.014	0.057
2	1435 ml	1.013	0.152
3	910 ml	1.012	0.062
4	1400 ml	1.012	0.077
5	1160 ml	1.012	0.066
6	1370 ml	1.011	0.0256
7	1800 ml	1.012	0.0221
8	940 ml	1.012	0.0227
9	580 ml	1.012	0.0022
10	505 ml	1.012	0.0057
11	650 ml	1.010	0.0097
12	640 ml	1.010	
13	640 ml	1.010	

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Table III

Daily Plutonium Urinary Excretion (Female-UX-300)

Days after irradiation	24-hour volume	specific activity	percent of injected dose excreted
1	1630 ml	1.082	0.352
2	1725 ml	1.080	0.367
3	1750 ml	1.082	0.657
4	1150 ml	1.082	0.633
5	2020 ml	1.083	0.642
6	1330 ml	1.080	0.642
7	1190 ml	1.080	0.6249
8	1500 ml	1.080	0.6251
9	1400 ml	1.080	0.619
10	1280 ml	1.080	0.630
11	1230 ml	1.080	0.619
12	940 ml	1.080	0.614
13	675 ml	1.080	
14	620 ml	1.080	
15	600 ml	1.080	

Plutonium Therapy: Studies are being completed on the effect of pH and citric acid concentration on the diffusibility of Pu(IV) through collophane membranes using low pressure ultrafiltration techniques. A report summarizing the results obtained in preliminary studies of Pu therapy is being prepared.

Results of ultrafiltration tests show that a pH of about 2.5 immediately precedes a steep drop in the extent of Pu(IV) which is diffusible, thus indicating, it is presumed, the onset of definite colloidal. At a pH of 7.3 and in the presence of varying amounts of citric acid, it is found that:

- (a) As little as 0.0001 M citric acid appreciably increases the diffusibility of Pu.
- (b) A minimum in the diffusibility of Pu occurs at .005 - .006 M citric acid. This phenomenon, if confirmable, may be

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